

Show all work.

1. Find the equation in slope intercept form for the line containing the points (3, -17) and (-4, 18).

$$\frac{-17-18}{3+4} = \frac{-35}{7} = -5$$

$$y-18 = -5(x+4)$$

$$y-18 = -5x-20$$

$$y = -5x-2$$

2. Find the domain of

$$f(x) = \sqrt{2(x-3)-1}$$

$$2(x-3)-1 \geq 0 \quad \left[\frac{7}{2}, \infty\right)$$

$$2x-6-1 \geq 0$$

$$2x \geq 7$$

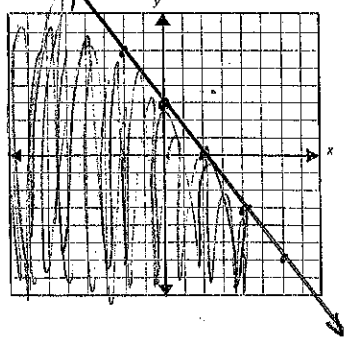
$$x \geq \frac{7}{2}$$

3. Graph the linear inequality

$$3x+2y \leq 6$$

$$2y \leq -3x+6$$

$$y \leq -\frac{3}{2}x+3$$



4. Solve: $\frac{3y+4}{10} = \frac{y}{5}$

$$15y+20 = 10y$$

$$5y = -20$$

$$y = -4$$

5. Simplify: $\sqrt[4]{81x^{12}y^2z^{15}}$

$$3x^3z^3\sqrt[4]{y^2z^3}$$

6. Solve: $|2x-2|=5$

$$2x-2=5$$

$$2x=7$$

$$x = \frac{7}{2}$$

$$2x-2=-5$$

$$2x=-3$$

$$x = -\frac{3}{2}$$

7. Let $f(x) = 3x-4$ and $g(x) = -2x^2$. Find the following.

a. $(g-f)(x)$

$$-2x^2 - (3x-4) = -2x^2 - 3x + 4$$

b. $(f \cdot g)(x)$

$$(-2x^2)(3x-4) = -6x^3 + 8x^2$$

c. $\left(\frac{g}{f}\right)(x)$

$$\frac{-2x^2}{3x-4}; x \neq \frac{4}{3}$$

d. $(g \circ f)(x)$

$$g(3x-4) \rightarrow -2(3x-4)^2$$

$$-2(9x^2-24x+16) \rightarrow -18x^2+48x-32$$

e. $(f \circ g)(-3)$

$$\rightarrow -2(-3)^2 = -18$$

$$3(-18)-4 = -58$$

8. Solve by substitution:

$$\begin{cases} y = 12x-3 \\ 4x-y = -1 \end{cases} \quad \begin{aligned} 4x - (12x-3) &= -1 \\ 4x - 12x + 3 &= -1 \end{aligned}$$

$$-8x = -4$$

$$x = \frac{1}{2}$$

$$y = 12\left(\frac{1}{2}\right) - 3 = 3$$

9. Evaluate: $5 + (6-2^2) - 12 \div 2 \times 3$

$$5 + 2 - 18$$

$$-11$$

10. Find the inverse of $f(x) = \frac{3x-4}{5}$.

$$x = \frac{3y-4}{5}$$

$$3y-4=5x$$

$$3y=5x+4$$

$$f^{-1}(x) = \frac{5x+4}{3}$$

11. Simplify: $(7+3i)(2-5i)$

$$14-35i+6i-15i^2$$

$$14-29i+15$$

$$29-29i$$

12. What is the conjugate of $8-5i$?

$$8+5i$$

13. Factor: $9x^2-6x+1$

$$(3x-1)(3x-1)$$

$$(3x-1)^2$$

14. Find the roots: $x^2+4x-9=0$

$$\frac{-4 \pm \sqrt{16-4(1)(-9)}}{2} = \frac{-4 \pm \sqrt{52}}{2}$$

$$\frac{-4 \pm 2\sqrt{13}}{2} = -2 \pm \sqrt{13}$$

15. How many ways can you choose 2 books from a set of 10?

$${}_{10}C_2 = 45 \text{ ways}$$

16. Write as a single logarithm:

$$3\log_2 x + 5\log_2 y$$

$$\log_2 x^3 + \log_2 y^5 = \log_2 x^3 y^5$$

17. Solve: $\left(\frac{2\sqrt{2x-3}}{2}\right)^2 = \frac{10}{2}$

$$(\sqrt{2x-3})^2 = (5)^2$$

$$2x-3=25$$

$$2x=28$$

$$x=14$$

18. A lab sample contains 400 bacteria that increases by 9% every hour. Predict the number of bacteria after 3 hours.

$$400(1.09)^3$$

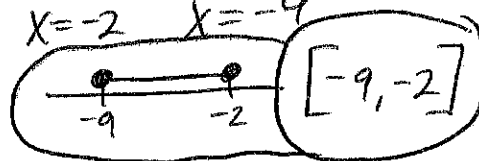
$$518.01 \text{ bacteria}$$

19. Graph the solution:

$$x^2+11x+18 \leq 0$$

$$(x+2)(x+9)$$

$$x=-2 \quad x=-9$$



20. Find the distance between $(6, -2)$ and $(2, 4)$.

$$d = \sqrt{(6-2)^2 + (-2-4)^2}$$

$$\sqrt{16+36} = \sqrt{52} =$$

$$d = 2\sqrt{13}$$

21. Simplify: $(3+2\sqrt{50}) - (6+3\sqrt{8})$

$$3+2\sqrt{50} - 6 - 3\sqrt{8}$$

$$3+10\sqrt{2} - 6 - 6\sqrt{2}$$

$$-3+4\sqrt{2}$$